

HOW TO OPERATE THE
No. 28 ASR
TELETYPEWRITER
ON TELETYPEWRITER EXCHANGE SERVICE



TWX

For assistance on a call
or for special service, dial: 954-1212

For information
about TWX numbers, dial: 910 555-1212

To report trouble, telephone: _____

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**HOW TO OPERATE
THE NO. 28
AUTOMATIC SEND-RECEIVE TELETYPEWRITER
ON TELETYPEWRITER EXCHANGE SERVICE**

FOREWORD

These instructions cover operation of the No. 28 AUTOMATIC SEND-RECEIVE TELETYPEWRITER on teletypewriter exchange service and are intended as a convenient source of reference for teletypewriter attendants following their training.

A Telephone Company representative is at the service of those who manage or operate teletypewriters. Her experience, advice and knowledge are available to use as occasion may require. This service is offered without charge in the interest of good teletypewriter service.

This manual describes operation of the No. 28 ASR Teletypewriter on Teletypewriter Exchange Service (TWX). Separate instructions for Private Line Service are also available and may be obtained from your Telephone Company representative when needed.

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TELETYPEWRITER SERVICE

Teletypewriter service is a typewritten communication service furnished by means of electrically energized teletypewriters connected by a circuit so that operation of one machine instantly reproduces a typed message on the connected teletypewriters. In appearance and operation, a teletypewriter is similar to a typewriter.

The Telephone Company offers two kinds of teletypewriter service, Exchange Service and Private Line Service.

Exchange Service

Teletypewriter Exchange Service which is also known as "TWX," is similar to dial telephone service except that communication is typewritten on teletypewriters instead of spoken. TWX stations are connected to dial telephone central office equipment. Any TWX station may dial any other TWX station. On certain types of calls, such as conference calls, connection is made by the TWX assistance operator. Connections provide two-way communication, allowing each station to send and receive alternately on the same connection.

Private Line Service

Teletypewriter Private Line Service provides continuous, direct connection between two or more teletypewriters at specific locations. Private Line Service does not connect with a telephone central office and there is no interconnection with TWX stations. There are two kinds of Private Line Service, Half and Full Duplex.

Generally, Half Duplex Service provides alternate two-way communication. With this arrangement, a channel is furnished on which messages can be transmitted alternately in either direction, one station sending at a time. Each station may send and receive, but may not do both at the same time. Another arrangement of Half Duplex Service provides a channel for transmitting messages in one direction only, usually with one station equipped for sending and the other station(s) for receiving only.

Full Duplex Service provides simultaneous two-way communication. A channel is furnished for transmission in one direction,

and another channel for transmission in the opposite direction. Two stations may send at the same time, one on each channel. Thus, a station may send on its outgoing channel and, at the same time, receive on its incoming channel.

DIRECT DIALING

Faster service is obtained by direct dialing. Whenever assistance or some special service is required in obtaining a connection, however, the call may be placed with the TWX assistance operator.

Note: On calls dialed direct and on assistance calls, if the called station is arranged for automatic answering, the call will be completed to the called station whether or not an attendant is present at that station.

For special services that are available, calls are placed with the TWX assistance operator as described on Page 26. These special service calls are:

Conference Calls

Conference service is available to all TWX stations. This service permits several stations to be interconnected simultaneously for communication with each other. Thus, one TWX station can send a message to several other TWX stations, in the same or in distant cities, and receive replies from these stations.

Sequence Calls

When a number of teletypewriter connections are required, all the called station numbers may be given to the operator at one time, if desired. The operator will then complete the calls in sequence, establishing each succeeding call as soon as possible after receiving a disconnect signal on the previous one. Normally, however, such calls are completed more quickly when each call is dialed direct rather than placed with the operator.

Collect Calls

Out-of-town calls may be placed with the operator on a "collect" basis, that is, billed to the called station, if the latter agrees to accept the charge.

Requests for Time and Charge

Whenever it is necessary to obtain the time and charge at the end of a call, the call is placed with the operator.

TELETYPEWRITER EXCHANGE SERVICE

The dial equipment of a TWX station is connected to dial telephone central office equipment. Each TWX station is assigned a ten-digit dial telephone number.

A loudspeaker, or, the listening portion of a telephone handset is provided.

The dial line is not equipped for voice communication, but on calls which are dialed direct the attendant can hear dial tone, "busy" signal, recorded announcements, and verbal responses.

Note: On calls placed with the TWX assistance operator, while the operator is attempting to reach the called station, the calling attendant will not hear any signals denoting the progress of the call.

If the called station is slow in answering, it may sometimes take a minute or so before the TWX assistance operator is free to type a report on the call, because if she is typing when the called station answers, the typing will be garbled.

In some cases, a rotary type dial is provided and in other cases touch tone type keys are provided. Control buttons, for placing the station in various modes of operation, are also provided.

Messages may be transmitted either by typing on the keyboard or by use of a perforated tape. Messages transmitted are printed simultaneously on any other teletypewriter connected to the line. The **KEYBOARD**, **TYPING UNIT** (page printer), **TAPE PUNCH** (perforator or reperforator), and **TAPE READER** (transmitter-distributor), form the basic elements of this teletypewriter.

On keyboard operation, as the keys are operated this mechanical action is translated into coded electrical signals and trans-

mitted to the connected teletypewriter(s). The typing unit senses the electrical signals and converts them to mechanical action, operating the type pallets and the non-printing functions, such as spacing and shifting, thus producing the message on paper.

On tape transmission, as the tape feeds through the TAPE READER (transmitter-distributor), the electrical signals are transmitted to the connected teletypewriter(s) where the TYPING UNIT senses the electrical signals and converts them to mechanical action, thus operating the type pallets and producing the printed message.

When the machine at a receiving station is equipped with a reperforator punch mechanism, incoming messages may be received on the page printer, on tape, or on both simultaneously.

If desired, a TWX station may be arranged for automatic answering, i.e., an attendant need not type the answer to incoming calls. When an incoming call is connected to the station, the teletypewriter will automatically be placed in the answering mode, and the station identification will automatically be typed back to the calling station. This automatic answer-back is arranged in the station equipment by the Telephone Company. At the No. 28 teletypewriter an automatic answer-back is an answering phrase selected by the customer of a specified number of characters including spaces, punctuation, and typing functions. At some other models, merely the letter "V" will be typed as the answering indication.

DESCRIPTION OF THE NO. 28 AUTOMATIC SEND-RECEIVE TELETYPEWRITER

The numbered items correspond to the numbers in the illustration in Figure 1.

1. **Receiver.** The receiver portion of a handset by means of which dial tone, signals denoting the progress of the call, recorded announcements, or verbal responses may be heard.
2. **Dial.** For dialing the called number.

3. Control Buttons.

Answer. When an incoming call is connected to the station, the light flashes under the ANSWER control button and the bell rings. Answer the call by depressing the ANSWER control button. The flashing light becomes steady. After about one second the teletypewriter is turned on automatically.

Clear. Depress this button to disconnect. The CLEAR light appears for about one second indicating that disconnection has taken place. The teletypewriter is turned off automatically.

Originate. To originate a call, pick up the handset and depress the ORIGINATE control button. This sets the equipment to obtain dial tone. When heard, the called number is dialed. When connection is made to the called station, a momentary spurt of high pitched tone is heard and, after about one second, both teletypewriters are turned on automatically.

Test. This control button is used when it is necessary for the Telephone Company to test the equipment. Normally, this key is not operated by the attendant except as requested by the Telephone Company.

Local. Depress this button whenever some local off-line work is to be done, such as practicing, or changing paper or ribbon. When the local work has been completed, the CLEAR button is depressed to remove the station from the LOCAL mode. Local use of the equipment does not make the station "busy" to incoming calls.

- 4. Keyboard.** For detailed description, see paragraph entitled, "KEYBOARD," on Page 11.
- 5. Bulletin Holders.** One holder is for listing customer information, such as frequently called numbers. The other holder is for the use of the Telephone Company in showing, for example, the teletypewriter station number or directions for reporting trouble.

6. **Character Counter.** Operates in conjunction with high speed tape perforation when not using the page printer for monitoring. This counter registers the count of characters being perforated in relation to the position they would occupy on a page printer line. The counter is adjustable, and the standard adjustment for TWX is 72 characters to a line. The counter adjustment must be made by the Telephone Company.
7. **Copyholder and Line Guide.** The holder provides a convenient place for the message that is to be transmitted by typing on the keyboard. The line guide may be used to follow the lines for typing.
8. **End-of-Line Indicator Light.** This lamp lights about six characters before the end of the line. The machine is adjusted to type 72 characters to a line, including the spaces between typed words.
9. **Right Front Door.** This door is hinged at the front and must be raised before the right top door can be raised. Provides access to typing unit; message paper; paper release and a line space levers; and ribbon spools.
10. **Paper Release Lever.** Located under cover. When pushed back, frees the paper for adjustment. When pulled forward, holds paper tight.
11. **Right Top Door.** See Item 9.
12. **Message.** Copy of message being transmitted by typing on the keyboard.
13. **Line Space Lever.** Located under the cover. Move forward for single spacing; backward, for double spacing.
14. **Center Front Door.** Provides access to the punch; ribbon spools (if a typing mechanism is included with the punch); and tape.
15. **Center Top Door.** Provides access to perforator tape supply.

16. Tape Punch. Mechanism for punching tape.

Operation of the TAPE PUNCH is controlled by the KEYBOARD CONTROL KNOB, as described in Item 20.

Four kinds of tape punches are available, namely, the non-typing perforator, the typing perforator, the non-typing reperforator, and the typing reperforator.

"Typing" and "non-typing" refers to whether or not the message is printed on the tape as it is being punched.

Each of these units can be used as a perforator for punching tape by operation of the local keyboard. When a machine is equipped with a reperforator mechanism, tape can be punched upon receipt of electrical signals from a remote location.

A reperforator can be used for only one function at a time, i.e., as a punch, or, as a reperforator.

The punch perforates a five-level chadless tape. The tape is called "chadless" because it is only partially perforated, leaving no punched-out waste or "chad." The code holes can be read in the same manner as fully perforated tape. (See Figure 3.)

17. Tape Reader. The TAPE READER (transmitter-distributor) is the mechanism that permits the automatic transmission of data from a perforated tape.

Either chadless (fully perforated) or chadless (partially perforated) five-level, standard 11/16 inch paper tape may be used.

The TAPE READER is equipped with five sensing pins which sense the codes represented by the perforations in the tape, convert the codes to electrical signals, and automatically transmit them to the station(s) on the connection.

When tape is in the reader, a TAPE GATE (Figure 2) holds the tape in place and keeps it in contact with the sensing pins. A sixth sensing pin, known as the "end-of-tape" or "tape out" pin, functions so as to stop the reader from operating, either at the end of a tape or when there is no tape in the reader.

18. Tape Read Switch. A three-position manual control switch mounted on the tape reader. The three positions of this switch are:

RUN. When switch is moved to the extreme right, the reader is in condition to start operating.

STOP. When switch is in the center position, the TAPE READER stops.

FREE. When switch is moved to the extreme left, the tape feed wheel moves freely in either direction. This permits tape to be inserted without opening the TAPE GATE as long as the tape is flat and evenly torn. The switch is also placed in the FREE position whenever it is necessary to re-position a tape that is already in the reader.

Whenever it is necessary to open the TAPE GATE, the TAPE GATE RELEASE LEVER (red) is pressed.

The tape is kept flat and under proper tension by the TAUT TAPE LEVER. If tape becomes taut or tangled, the lever is raised by the tape and this causes the TAPE READER to stop. Therefore, when tape is inserted it should always be fed under this lever.

The tape fits between TAPE GUIDES. There is an engraved line on each guide for positioning the tape. For detailed instructions on positioning tape in the TAPE READER, see paragraph entitled, "PLACING TAPE IN THE TAPE READER," on Page 22.

19. **Dome Release Button.** One button is located on each of the end sides of the cabinet. To open the entire dome of the cabinet, the two buttons are pressed to release the locks. It is intended that the dome be opened for maintenance purposes only. The individual doors are designed to permit the attendant to have access to various parts of the machine as needed.

20. **Keyboard Control Knob.** More than one mode of operation is available on the No. 28 Automatic-Send-Receive teletypewriter.

The modes of operation on individual machines depend on the kind of tape punch mechanism provided, as previously described and, also, on any local optional wiring arrangements.

The KEYBOARD CONTROL KNOB is used to select the desired mode of operation as follows:

- a. Machine equipped with either a typing or a non-typing perforator.

K (Keyboard). A message can be transmitted by typing on the keyboard without producing a perforated tape. A page copy can also be obtained.

K-T (Keyboard-Tape). With the SEND key depressed, the keyboard can be used to transmit a message and to perforate a tape simultaneously. A page copy can also be obtained.

Note: In the case of machines equipped with both a non-typing perforator and the slow release relay feature, an alternate method of operation is as follows:

K-T. Typing on keyboard produces a page copy without transmitting to another station. The TAPE READER is operative, if the SEND key has been depressed. No page copy of any tape message transmitted will be produced.

T (Tape). The keyboard can be used for perforation of tape without a page copy. TAPE READER is operative when SEND key has been depressed.

- b. Machine equipped with either a typing or a non-typing reperforator.

K (Keyboard). A message can be transmitted directly by typing on keyboard. A page copy can also be obtained. Depending on local requirements, a typing or non-typing reperforator may be wired either to receive the same message as the page printer, or to an entirely separate signal line. Local wiring arrangements also determine whether typing on keyboard when the control knob is set at K will produce a tape.

The TAPE READER is inoperative when the control knob is set for K.

K-T (Keyboard-Tape). With the SEND key depressed, the keyboard can be used to transmit a message and to perforate a tape simultaneously. A page copy can also be obtained.

T (Tape). The keyboard can be used for perforation of tape without making a page copy. The TAPE READER is operative, if the SEND key has been depressed.

Cabinet. Various doors of the cabinet may be opened separately by means of small spring knobs. These knobs are moved sideways to release the catch, and then may be used as convenient holders to raise the doors. The purpose of the doors is to enable the attendant to gain needed access to specific parts of the machine, while the rest of the equipment remains covered. The entire dome is opened for maintenance purposes only. Figure 4 shows a cabinet with the dome opened.

At stations equipped for automatic answering, the LOCAL control button is depressed before changing or adjusting paper or ribbon. This disables the automatic answering feature and insures that the teletypewriter will not be automatically turned on and an automatic answer-back given on an incoming call while the work mentioned is being done.

For access to the TYPING UNIT to change paper or ribbon, or to clean the type, the right front and top doors are opened. When inserting a new supply of perforator tape, the center top door is opened. For access to the PUNCH, the center front door is opened.

To turn the paper up or down, raise the right front and top doors, press and hold down the PLATEN HANDWHEEL so that it engages the platen ratchet wheel, while turning it in the desired direction. Do not attempt to hold down or turn the PLATEN HANDWHEEL while the teletypewriter is operating.

To adjust paper, raise the right front and top doors, push back the PAPER RELEASE LEVER to free the paper. After adjusting the paper, pull the lever forward again.

To set the line spacing for single or double space, raise the right front and top doors, press the LINE SPACE LEVER to the left and move it forward for single space or backward for double space.

Copy illuminating lamps are provided in the PAGE PRINTER, TAPE PUNCH, and TAPE READER areas. The laminated glass in the windows of the cabinet is positioned at an angle that prevents glare and distortion.

KEYBOARD

A sample keyboard arrangement is shown in Figure 5.

The keyboard is similar to a typewriter keyboard but has three rows of (green) keys for typing instead of four. It also has one key less at the right end of each row. It types the letters of the alphabet in capitals only (this is the lower case). By depressing the FIGS (figures) key, it shifts to the upper case for typing numerals, punctuation marks, and other special characters that are shown on the upper portion of the key tops. On many standard typewriters, the lower case "L" is used for the numeral "1" but, since there are no lower case letters on the teletypewriter, the numeral "1" is located on the upper case "Q."

The LTRS (letters) key is for shifting from upper to lower case.

The CAR RET (carriage return) key returns type box to left margin.

The LINE FEED key is for feeding up the paper.

The HERE IS key is used to manually generate the automatic answer-back. This key appears only at stations arranged for automatic answering.

The keys in the top row are for special operations, as follows:

LOC LF (Local Line Feed)—to feed up paper on local machine only.

REC (Receive)—to lock the keyboard on the local machine.

SEND—to unlock or free the keyboard of the local machine for typing and to permit operation of the TAPE READER.

BREAK—to stop another station's sending. For the BREAK operation to be effective, this key is held depressed for about two seconds.

TAPE B SP (Tape Back Space)—to back space tape which is being perforated whenever it is necessary to correct a tape error.

REPT (Repeat)—to repeat a character by depressing the character key and then the REPT key; when the character key is released, the REPT key is held down for as long as it is desired to repeat the same character. The REPT key is operative in all three positions of the KEYBOARD CONTROL KNOB: K-KT-T.

LOC CR (Local Carriage Return)—to return the type box to the left margin on local machine only.

The BLANK key in the lower right-hand corner of the KEYBOARD has a non-printing function. It is used principally to perform certain operations that require the typing of codes; specific instructions are given for its use when needed. This key should not be depressed at any other time because it may interrupt a message.

Typing Technique

Correct posture at the teletypewriter is important so that the attendant can work with ease and be both accurate and speedy. The chair should be adjusted to a comfortable height which will allow an erect but relaxed position with feet resting flat on the floor. The hands should be parallel to the KEYBOARD with the fingers arched and lightly touching the guide keys; wrists in line with the forearms; and elbows in close to the sides.

A light, even, rhythmic touch on the keys is most satisfactory. Force is unnecessary because the teletypewriter is operated electrically.

To become skillful, proficiency in the touch system of typing is highly desirable, using the same fingering as on the typewriter. The CAR RET key is used as a guide key for the little finger of the right hand, and the A key for the little finger of the left hand.

Non-Printing Operations

To shift the teletypewriter from the lower to the upper case for typing numerals, punctuations, and other special characters, press the FIGS key.

To return the teletypewriter from the upper to the lower case, press the LTRS key or the SPACE BAR. When the latter is used, it will space in addition to returning the teletypewriter to the position for typing letters of the alphabet.

To space between words or characters, press the SPACE BAR. If the teletypewriter is in the upper case, operation of the SPACE BAR will return it to the lower case in addition to spacing. Therefore, if an upper case character is to be typed after operation of the SPACE BAR, the FIGS key is operated before continuing to type.

To return the type box to the left margin, press the CAR RET key.

To feed the paper up, one line at a time, press the LINE FEED key once for each line.

To begin a new line of typing, press the keys indicated in the following order:

CAR RET
LINE FEED
LTRS

This returns the carriage to the left margin in the lower case. If, however, the next line is to start in the upper case, the FIGS key must be depressed in order to shift to the upper case.

To ring the bell for signalling the distant station, press the FIGS key and then the BELL key.

The BLANK key is used only when specified for the typing of certain codes.

TYPING UNIT

(Page Printer)

The TYPING UNIT is illustrated in Figure 6.

Printing is produced by the TYPE BOX (Figure 7), which contains the characters and symbols shown on the keytops. Operation of the printing keys and SPACE BAR moves the TYPE BOX across the platen from left to right. On each key stroke, the TYPE BOX is moved into position for the printing hammer to strike the proper type pallet, printing the character on the paper. Operation of the CAR RET key returns the TYPE BOX to the left margin and operation of the LINE FEED key moves the paper up to the next line. The type box carriage is shown in Figure 8.

The force of the printing blow is controlled by the PRINTING SPRING ADJUSTING BRACKET, which is set for the individual service requirement according to the number of copies used. Notch 1, is for one to three copies; Notch 2, is for four and five copies; and Notch 3, is for six or more copies.

If the carbon copies are either too light or too dark, the force of the printing blow can be adjusted by moving the PRINTING

SPRING ADJUSTING BRACKET, taking care not to make the printing blow any heavier than is necessary to produce satisfactory copies.

Type Box

The following is a description of the TYPE BOX (Figure 7).

- a. The type pallets are arranged in columns and rows. The TYPE BOX moves up and down as well as left and right, in selecting the row and column in which each character to be printed is located.
- b. Lower case characters (letters) are in the left half of the box and upper case characters (figures, etc.,) are in the right half. The TYPE BOX moves left and right on shifting operations rather than in the familiar up and down motion on the typewriter.
- c. These combined movements bring the character to be printed into line with the PRINTING HAMMER.
- d. There are two POINTERS on the TYPE BOX, the LTRS POINTER on the left, and the FIGS POINTER on the right. When typing stops, the POINTER at which the PRINTING HAMMER is aimed indicates where the next character will be printed. If the PRINTING HAMMER is aimed at the LTRS POINTER, the TYPE Box is in the lower case; if it is aimed at the FIGS POINTER, the TYPE BOX is in the upper case. The operation of shifting the TYPE BOX to upper or lower case, moves the corresponding pointer to the typing location.

Cleaning the Type

The type should be cleaned whenever the printing is smudged. To clean the type, proceed as follows:

- a. Depress LOCAL control button.
- b. Open the right front and top doors.
- c. Unlock the TYPE BOX LATCH by moving it to the right.
- d. Holding the HANDLE on the right side of the TYPE BOX, move the right side of the box up and toward the left to unhook it on the left side and remove it.

- e. Using a dry, hard-bristle brush (such as typewriter brush), brush the type. Do not brush dirt into the machine or on clothing. Do not use any cleaning solution on the TYPE BOX.
- f. To replace the TYPE BOX, hold it with the type facing the PLATEN and the large hook at the left. Slip this hook under the STUD in front of the LEFT TYPE BOX ROLLER and push smaller hook on the right side down into place on the STUD in front of the RIGHT TYPE BOX ROLLER. Hold the type box LATCH in horizontal position and move it to the left over the LATCHING NOTCH as far as it will go. Raise the LATCH to a vertical position and press it to the left until it locks into the LATCHING NOTCH. (Figure 8.)
- g. Ascertain that the ribbon is still properly threaded through the guides.
- h. Close the right top door. Then, with the paper feeding out on top, close the right front door.
- i. Depress CLEAR control button.

Changing the Teletypewriter Ribbon

Use a standard teletypewriter ribbon. This type of ribbon is similar to a typewriter ribbon but is made especially for teletypewriter use. It is one-half inch wide, has a reversing eyelet at each end of the ribbon, and is on a spool that fits the teletypewriter ribbon spool shaft. (See Figure 9.)

The condition of the ribbon should be checked frequently so that it can be replaced as soon as it becomes worn. Otherwise, it may produce illegible copy or cause service interruptions. To change the ribbon proceed as follows:

- a. Depress the LOCAL control button.
- b. Open the right front and top doors.
- c. Lift the RIBBON SPOOL LOCKS to a vertical position and remove both SPOOLS from the RIBBON SPOOL SHAFTS.
- d. Remove the RIBBON from the RIBBON ROLLERS, RIBBON REVERSE LEVERS, and RIBBON GUIDES.
- e. Unwind and remove the old ribbon from one of the SPOOLS.
- f. Hook the end of a new ribbon to the hub of the empty SPOOL and wind the RIBBON until the reversing eyelet is on the SPOOL. If the ribbon does not have a hook at the end, the

SPOOL will have a barb which should be used to pierce the RIBBON near its end.

- g. Replace the SPOOLS on the RIBBON SPOOL SHAFTS, making sure that the SPOOLS go down on the shafts and that the ribbon feeds from the outside of the SPOOLS. Turn the RIBBON SPOOL LOCKS down in a horizontal position. This locks the SPOOLS in place.
- h. Thread the ribbon forward around both RIBBON ROLLERS, through the slots in the RIBBON REVERSE LEVERS and RIBBON GUIDES. Take up the slack by turning the free SPOOL. Then, determine that the ribbon is still properly threaded through the guides and that the reversing eyelet is between the SPOOL and the REVERSE LEVER.
- i. Ascertain that the TYPE BOX LATCH has not been disengaged.
- j. Close the top door. Bring the paper up a few inches. Then close the right front door with the paper feeding out the top.
- k. Depress the CLEAR control button.

Inserting Paper in the Teletypewriter

Check the supply of paper in the teletypewriter frequently to avoid having it run out in the middle of a message. The approach of the end of a roll or supply is usually indicated by a colored streak on the paper. Replenish with a new supply of paper as soon as feasible after this streak appears.

Friction Feed

To insert a new supply of paper in the friction feed teletypewriter, (Figure 10) proceed as follows:

- a. Depress LOCAL control button.
- b. Open the right front and top doors.
- c. Move the PAPER RELEASE LEVER back, lift the PAPER FINGERS, and pull the paper out from under the PLATEN.
- d. Lift out the used roll.
- e. Remove the SPINDLE from the core of the used roll; insert it in the new roll; place the new roll in the machine with the SPINDLE in the SPINDLE GROOVES. Have the paper feeding from underneath the roll toward the PLATEN.

- f. Feed the paper over the PAPER STRAIGHTENER ROD, down under the PLATEN and up between the PLATEN and the PAPER FINGERS.
- g. Pull paper up a few inches beyond top of PLATEN. Straighten the paper. Lower the PAPER FINGERS to rest on the paper. Move the PAPER RELEASE LEVER forward.
- h. When inserting paper, do not disturb the RIBBON or the TYPE BOX LATCH. After paper is in place, ascertain that ribbon is still properly threaded through RIBBON GUIDES. Also, that TYPE BOX LATCH has not been disengaged.
- i. Close the right top door. Bring up the end of the paper so that it feeds out between the doors before closing the right front door.
- j. Depress the CLEAR control button.

Sprocket Feed

To insert a new supply of paper in the sprocket feed teletypewriter (Figure 11), proceed as follows:

- a. Depress LOCAL control button.
- b. Feed paper through PAPER SLOT in rear of machine over LOADING PLATE as far as it will go. If machine has a PAPER BOX, (Figure 12), catch a sprocket hole on PAPER HOLDING HOOK to prevent paper from slipping back, then lower FORM ACCUMULATOR SHELF.
- c. Open the right front and top doors.
- d. Move PAPER RELEASE LEVER back to raise the paper guide.
- e. Feed paper under the PLATEN, keeping it against left side of LOADING PLATE. Depress and turn PLATEN to keep it under the PAPER GUIDE, turn paper up to first line of form, then set the INDEX WHEEL as described under, "PAGE FEEDOUT (FORM STARTER)." Be careful not to disturb the RIBBON or TYPE BOX LATCH.
- f. Press PAPER GUIDE down on the paper.
- g. After paper is in place, check to see that the RIBBON is still properly threaded through the RIBBON GUIDES and that TYPE BOX LATCH is in locked position holding TYPE BOX firmly in place.

- h. Close the top door. Bring up the end of the paper and close the right front door with the paper feeding out at the top.
- i. Depress the CLEAR control button.

Note: If an incoming call is received while you are changing the paper, the tape, or ribbon, always complete this work before answering the call.

Use of Paper Box

When a paper box for superfold paper (Figure 12) is provided, handle the paper supply as follows:

- a. Open PAPER BOX by raising FORM ACCUMULATOR SHELF.
- b. Slit open top of carton and cut off small tabs.
- c. Determine which way to place the paper—form paper should be placed so that the first page will feed on to the LOADING PLATE in rear of teletypewriter with printed side down; multi-copy paper should be placed with carbon side of carbon paper up.
- d. In lifting carton, the larger tabs may be bent down against carton sides and grasped from underneath as holders.
- e. Lower the carton into the PAPER BOX and cut off the tabs; or, if space permits, the carton may be slid into the PAPER BOX from the rear.
- f. If it is desired to remove paper from carton, slit open bottom of carton. Then, holding bottom tabs closed, lift carton and hold it squarely over PAPER BOX; move hands to carton sides allowing paper to drop into PAPER BOX.

Page Feedout (Form Starter)

The PAGE FEEDOUT (FORM STARTER) device makes it possible to automatically feed paper up to the same location on each page or form on all connected teletypewriters by operating FIGS key followed by upper case Z. Follow this with a double operation of the LTRS key when typing is to start in lower case, or a double operation of the FIGS key if typing is to start in upper case.

After inserting a new supply of paper, "index" the paper for PAGE FEEDOUT (Figure 11) as follows:

Set the paper at the first typing line, then pull out and turn the INDEX WHEEL and set the white INDEX LINE at the POINTER. This registers the location for the first typing line on the page or form in exact correspondence with the other teletypewriters on the circuit.

After indexing, operation of FIGS and upper case Z keys by the sending station will always feed paper up automatically to the first typing line on the next page or form on all connected teletypewriters.

TAPE PUNCH

(Perforator or Reperforator)

The perforators are used for perforation of tape by operation of local keyboard only.

The reperforators are used as perforators for perforation of tape by operation of the local keyboard and as reperforators for perforation of tape from signals received over a signal line.

These punch units perforate standard 11/16" paper tape into five-level chadless form.

When a teletypewriter is equipped with a reperforator, both operations of perforating and reperforating can not be done simultaneously.

Following is a description of the tape punch:

- a. Non-Typing Perforator. This is the basic punch unit. It is used for preparing tape by operation of the local keyboard only. When operating "on-line" at the rate of 100 wpm, tape can be prepared and a page copy obtained simultaneously. When "off-line," tape can be prepared in excess of 100 wpm, while the page printer is being used either to receive incoming messages or to monitor a tape being transmitted through the tape reader.
- b. Typing Perforator. Same mechanism as described in "a," except that the message is printed on the tape as the latter is perforated.
- c. Non-Typing Reperforator. This is the basic punch unit to which a receiving selector mechanism has been added which

- permits the perforation of tape from remote sources.
- d. Typing Reperforator. Same mechanism as described in "c," except that the message is printed on the tape as the latter is reperforated.

Placing Supply of Perforator Tape in a Punch

Check the supply of perforator type frequently to avoid having it run out in the middle of a message. The approach of the end of the roll is usually indicated by a colored streak near the end of the roll of tape. Insert a new supply of tape as soon as feasible after this streak appears.

To place a new roll of perforator tape (Figure 4) in the teletypewriter, proceed as follows:

- a. Depress LOCAL control button.
- b. Open the center top door.
- c. Tear off the old tape at the tape chute. Feed out the remaining piece of tape in the punch block by repeated operation of the LTRS key.
- d. Lift the used roll of tape out of the holder. Place new roll of tape on spindle in holder with tape feeding out from the top of the roll.
- e. Thread end of tape through tape guide arm and down into tape chute. As the paper is eased through the chute, repeatedly operate the LTRS key, until the tape goes through and is visible at the punch head.
- f. Close the door of the cabinet.
- g. Depress CLEAR control button.

USE OF THE TAPE PUNCH

For detailed operating instructions for perforating a tape, see the paragraph entitled, "PREPARING AND HANDLING TAPE MESSAGES."

LEARNING TO READ THE PERFORATED CODES IN THE TAPE

The codes are shown in Figure 3. Your Telephone Company representative will be glad to furnish you with a code card.

The upper side of the tape usually has a slight roughness made by the perforations. Read the codes with that side uppermost.

There are five code positions which are numbered consecutively from No. 1 at the top of the tape to No. 5 at the bottom.

The small perforations between lines 2 and 3 are not part of the codes but are the tape feed perforations.

The "LTRS" code has perforations in all five positions. Other codes have perforations in different combinations of positions. For instance, "A" is the 1-2 code, "B" is 1-4-5. The blank is not a code but is only a tape feed perforation.

Read the codes in the lower case until a "FIGS" code appears.

Following a "FIGS" code, read the codes in upper case until a "LTRS" code or a space appears, after which read the codes in the lower case again. Learn to read the lower and upper case characters for each code.

In learning to read the codes, memorize several codes at a time. Then practice reading from a perforated tape the codes so memorized.

TAPE READER (Transmitter-Distributor)

The TAPE READER is the transmitter-distributor in the teletypewriter that controls the automatic transmission of data. The tape that can be accommodated in readers associated with the No. 28 ASR is a five-level tape. The tape may be chadless (fully perforated), or chadless (partially perforated). The following is a description of the tape reader:

- a. Fixed Head Single Contact Tape Reader (Figure 2).

This tape reader has a stationary tape sensing head, and a

three-position manual control switch, the positions being: RUN, STOP, and FREE. The tape reader senses codes perforated in the tape; converts the codes to electrical impulses; and automatically transmits them.

- b. Fixed Head Multi-Contact Tape Reader. Same as in "a" preceding, but in addition has a "signal distributor," which allows for incoding of electrical signals from some other source.

Placing Tape in the Tape Reader

- a. Fixed Tape Sensing Head. If the tape is smooth and evenly torn, it may be inserted with the control switch in the FREE position. Otherwise, it is usually necessary to open the hinged TAPE GATE by manually operating the release control lever below the TAPE GATE.

The tape is placed surface facing upward, in position between the tape guide bars, with the tape feed holes over the feed pins.

1. Single Contact TYPE TAPE READER. This type of reader reads the tape first and then feeds it. Therefore, when inserting the tape, the code holes of the first character to be transmitted are placed directly over the sensing pins. When positioning printed tape, the printed character to be transmitted is oriented with the engraved guide lines on the tape guide bars.
2. Multi-Contact Type Tape Reader. This type of reader feeds the tape first and then reads the code punched in it. Therefore, when inserting the tape, the code holes of the first character to be transmitted are placed one character ahead of the sensing pins instead of directly over them. A locating mark is provided one character ahead of the sensing pins. As an aid in positioning printed tape, the first printed character to be transmitted is oriented with the engraved guide lines on the tape guide bars provided for that purpose. (See Figure 2.)

If the TAPE GATE was opened, it is closed after inserting the tape merely by pressing the gate down (it snaps into locked position). The TAPE GATE keeps the tape flat and under proper tension.

When ready to start transmitting, the control switch is moved to the RUN position (the extreme right). A "tape out" sensing pin (the sixth pin), stops transmission automatically when the end of the tape has been reached. The "taut tape" device automatically stops transmission when the tape becomes taut in this type of tape reader.

Transmitting Tape Messages

For detailed operating instructions on transmitting tape messages, see the paragraph entitled, "PREPARING AND HANDLING TAPE MESSAGES."

OPERATING PRACTICES

Use of Teletypewriter Directory

If you are not sure of the number you wish to dial, consult the TWX Directory.

The directory is arranged by state, city and town headings in alphabetical order, with customers listed alphabetically under the city or town heading. A customer's listing consists of name, business (if not clearly indicated by the customer's name), address, department (where more than one), and the TWX number, consisting of a ten-digit station number.

The directory also contains Yellow Pages, "Teletypewriter Classified Directory," in the back of the book. Listings in this section are arranged by business headings in alphabetical sequence, with customers listed alphabetically under the business heading. A customer's listing consists of name, city or town and state, and department (where the customer has more than one station in that city), and the TWX number.

If this symbol § appears in the directory preceding a listing, it means that the station is equipped for automatic answering, and incoming messages may be received whether or not an attendant is present. There are two kinds of automatic answer: the letter "V," or, at the No. 28, a specified number of characters including symbols, spaces and typing function. In the latter case, the automatic answer is shown in the directory.

Reaching "Information"

If the desired number does not appear in the directory and you are sure they have TWX service, reach INFORMATION by dialing the code: 910 555-1212. The INFORMATION BUREAU is located in St. Louis and may be reached from all TWX stations by means of the same code.

After INFORMATION answers, type the details of the call giving the city and state first, followed by the called firm name and address. If a particular branch or department is desired, this is typed last. For example:

"Springfield Mass Acme Mills 109 Maple Shipping Dept "

Do not abbreviate city names. Standard abbreviations may be used for state names, however, as well as for street (ST), avenue (AVE), road (RD), boulevard (BLVD), etc.

When INFORMATION furnishes the number, acknowledge and disconnect by depressing the CLEAR control button.

It is desirable to keep a record of numbers obtained from the directory or from INFORMATION so that these numbers will be readily available for use on future calls. Always record all ten digits of a number and note their answer-back, if they have one.

Dialing a Call

- a. Ascertain that the KEYBOARD CONTROL KNOB is in the required position according to the mode of operation desired. Have TAPE READ switch in the STOP position.
- b. Pick up the receiver handset, if one is provided, and depress the ORIGINATE control button.
- c. Listen for dial tone. Dial the desired number, according to local instructions.
- d. Listen for any signal that may be received, such as the "busy" signal.
- e. When connection is made to the called station, a momentary spurt of high pitched tone is heard. After about one second, both calling and called teletypewriters are turned on automatically. The receiver handset is placed on the holder. The connection is now ready for teletypewriter communication.
- f. If any special service is desired, such as making a call "collect," place the call as described under, "SPECIAL SERVICES," on Page 30.

Transmitting a Message

- a. When the called station answers by typing their firm name or by an automatic answer-back, type your firm name and city, for example:
"SMITH JONES CO NY"
- b. Proceed to type the message or messages.
- c. If a tape message is to be transmitted, proceed as for, "Transmitting a Tape Message," under the heading, "PREPARING AND HANDLING TAPE MESSAGES," on Page 32.

Disconnecting at the Calling Station

- a. When finished transmitting a message, type "END."
- b. Wait for a response from the called station, which will be "END" or a message followed by "END." After both stations have typed "END," disconnect by depressing the CLEAR control button.
- c. On calls completed to stations arranged for automatic answer back, depress the CLEAR control button as soon as you have typed "END."
- d. Remove messages from the machine by feeding the paper up and tearing it against the edge of the door. After disconnecting, this may be done by first depressing the LOCAL control button.

Answering a Call

Station arranged for attended service only:

- a. When the bell rings, ascertain that the KEYBOARD CONTROL KNOB is in the desired position, and depress the ANSWER control button. The TAPE READ switch should be in the STOP position.
- b. After the teletypewriter is turned on, press the SEND key to release the keyboard for typing.
- c. Press the CAR RET-LINE FEED-LTRS keys.
- d. Answer by typing your firm name, for example, "SMITH JONES CO".
- e. Whenever all incoming calls are "collect" calls for which the charge is always accepted, add "OK COLLECT" to the answer without waiting for an announcement from the operator.

Station arranged for automatic answer:

- a. The bell rings, the light flashes under the ANSWER control button, and the teletypewriter is turned on automatically.
- b. The automatic answer is typed to the calling station.
- c. A message is received.
- d. The called station may transmit, if they wish.
- e. At the end of the message, the attendant at the originating station disconnects both stations by depressing the CLEAR button. The teletypewriter is turned off automatically.

Receiving a Message

The calling attendant will type the calling firm name and city, and then the message.

Disconnecting at the Called Station

- a. After receiving "END" from the calling station, either type "END" or send message followed by "END."
- b. Disconnect immediately after "END" by both stations by depressing the CLEAR control button.

Reaching TWX Assistance Operator

Whenever you encounter difficulty in dialing a call, you may obtain assistance from the TWX Assistance operator.

If an Intercepting operator is heard to answer, or, if you know that the desired number has been changed or disconnected, dial the TWX Assistance operator. She will give you a report on the status of the number.

To reach the operator, dial the code: 954-1212. When the operator answers, type the details of your call by giving the 10 digits of the called number; the reason for requesting assistance; and the 10 digits of your number. For example,

"415 399-5788 NO RING. THIS IS 212 393-3400."

The operator will try to complete the call for you.

Other typical reasons for requesting assistance are shown below, including reason for assistance as it is to be typed to the operator:

REASON	TYPE TO OPERATOR
Wrong teletypewriter number reached	"(cld no.) (no. of times) W NO (time of each attempt) THIS IS (clg no.)"
*Wrong telephone number reached	"(cld no.) (no. of times) VERBAL W NO (time of each attempt) THIS IS (clg no.)"
Intercepting operator or recording reached	"(cld no.) INTERCEPT. THIS IS (clg no.)"

*No more than two attempts are made to reach a number if a telephone customer is heard to answer.

Obtaining Credit

Whenever it is necessary to make a request for credit or for the adjustment of time or charge, reach the TWX Assistance operator and type the details of your request to her.

When a wrong number is reported and the operator establishes connection to the correct number, she automatically gives credit for the wrong number call(s).

Where a wrong number is reached first but the correct number is reached on a subsequent call, credit may be obtained by dialing the operator and typing:

"CREDIT (cld no.) (no. of calls) W NO (time) THIS IS (clg no.)."

Horizontal Tabulation

On teletypewriters that are not equipped with a horizontal TABULATOR device, tabulation is accomplished by using the SPACE BAR to space over to column locations. A suggested method which will conserve line time is described here and illustrated in Figure 13.

- Start the first column at the left margin.
- Allow enough space in each column to accommodate the number of characters in the longest item in the column.
- Use five spaces between columns; that is, space five times beyond the allotted number of spaces required for the longest item in the column.

- d. In spacing over to a column location, space until the POINTER at which the PRINTING HAMMER is aimed is at the desired typing location.

Examples of Messages

- a. Heading of a Formal Message. The first line shows the name and TWX number of the calling station, the date and time at which the message is sent and, where it is the practice to number the messages, the serial number of the message. The name and complete address of the called party then follows. For example:

ALPHA CO NY 212 393-9625 Oct 1 1962 2-15 273
Mr F S Brown
Beacon Co
218 S La Salle St
Chicago Ill

- b. Heading of an Informal Message. An informal message is one being sent to another branch of the same company and is usually in the nature of a memorandum. The calling office and the name of the particular individual in the called office are shown as:

ALPHA CO NY CLG
Mr S F Smith Production

- c. The Message. A typical message that contains a reasonable use of punctuation is illustrated in Figure 14. To insure numerical accuracy, the numbers in the body of a message are repeated at the end of the message. The sample message also shows how the service is used for two-way communication.

Correcting a Typing Error

If you detect a typing error immediately after making it, correct the error at once by typing "XXX" after the error, followed by a space. Then type the corrected words.

If you detect a typing error later, make the correction by typing at the end of the communication the word "CORRECTION" followed by, for example, "THIRD LINE FOURTH WORD SHOULD READ , " typing the corrected word.

Feeding Out Paper Locally

Before feeding out and removing the paper, it is always desirable to disconnect immediately upon completion of the call. To feed out the paper, depress the LOC LF key immediately upon disconnecting. This will release a sufficient amount of paper to tear off the message before the mechanism becomes idle. Also, if desired, the paper can be moved in either direction by raising the right front and top covers and manually turning the PLATEN HANDWHEEL.

Signaling the Distant Station during a Call

To signal the distant station during a call, press the FIGS key and then the BELL key. If this is followed by operation of the (FIGS C) WRU key it will generate the automatic answer back at a station equipped to return an automatic answer back *phrase*. At stations having "V" for their answer indication, and at stations not equipped for automatic answering, the attendant must manually type her answer to the WRU inquiry. If lower case characters are then desired, shift to lower case by depressing the LTRS key, or the SPACE BAR, if a space is desired.

Signaling the TWX Operator during a Call

To signal the central office operator during a call which has been placed with her, depress the BREAK key twice momentarily. This gives the operator a continuous signal which she will answer at the first opportunity.

To Interrupt (BREAK) the Sending Station

The sending station should be interrupted and asked to repeat when your copy becomes scrambled, overlined, or piled up. This interruption is accomplished by depressing the BREAK key for about two seconds. Wait for typing to stop. Then, after pressing the SEND key, type your reason for interrupting. As an example, in explaining the reason for breaking and indicating the point from which message should be repeated, you may use one of the following phrases:

"SCRAMBLED REPT FROM."
"OVERLINING REPT FROM"
"PILING REPT FROM."

If the trouble recurs, again interrupt. The station that originated the call should then place the call with the TWX operator requesting a better connection.

Sending Station Interrupted (BREAK)

If you receive a BREAK signal when you are transmitting, understand that the other party wishes to interrupt. Wait for the attendant to type the reason for interrupting, then depress the SEND key and proceed accordingly with your communication, from the point in the message indicated by the attendant who interrupted. However, if no communication is received within a few seconds, depress the SEND key and proceed with your communication.

If recurring trouble is indicated, the station that originated the call should place the call with the assistance operator and request a better connection by typing "BETTER CON."

Special Services

The following calls on which some special service is desired must be placed with the TWX assistance operator. On a collect call, whenever a called station is arranged for unattended service and you wish to be connected whether or not an attendant is on duty at the station, type the called number to the TWX assistance operator followed by "U" (unattended).

Conference Calls

To place a conference call, reach the TWX assistance operator and type "CONF" followed by the teletypewriter station numbers of the desired stations, including the word "AND" before the last of these numbers, adding, "THIS IS (clg no.)" and hold the line.

The operator will notify you when the conference is ready. At that time, type your firm name and city, followed by the message.

At the end of the message, type "END PLS ACK," and call the roll of stations by typing the name of each called place with or without their station number. When all the acknowledgments have been received, type "DISCONNECT" and then disconnect by depressing the CLEAR control button. In case no acknowledgment is required from the called stations, terminate the conference call by typing "END DISCONNECT," and then depress the CLEAR control button.

Note: Do not use the WRU (WHO ARE YOU) key (FIGS C) when calling the roll at the end of a conference call, because all stations on the connection with automatic answering will then respond to this code simultaneously and typing will be garbled.

Sequence Calls

Calls dialed direct by the attendant can be completed faster than calls placed with the assistance operator. However, if it is desired to place a number of calls to be completed in sequence, reach the TWX operator and type "SEQ" followed by the station numbers of the desired stations including the word "AND" before the last of these numbers, adding, "THIS IS (clg no.)."

The operator will notify you when each connection is ready, as for example, "RDY WITH NY." When the called station answers, type your firm name and city, followed by your message.

Be sure to disconnect by depressing the CLEAR control button after each call.

Collect Calls

To place a collect call, reach the TWX assistance operator and include the word "COLLECT" with your order.

The operator will announce the call as, "COLLECT," to the called station. If they accept the charge, type your firm name and city, followed by your message. Whenever a called station includes "OK COLLECT" when answering, an announcement by the TWX operator is unnecessary and the communication may begin.

Request for Time and Charge

Whenever it is necessary to obtain the time and charge at the end of a call, reach the TWX Assistance operator and place the call with her, including "T&C" with your order.

At the end of the communication, do not operate the CLEAR control button because this will disconnect you from the operator. Instead, signal the operator and wait for her reply. After she has typed the time and charge information to you, acknowledge and disconnect by depressing the CLEAR control button.

Delayed Calls

When dialing a number, if you encounter "busy" or other delay, disconnect and make another attempt later.

When the TWX Assistance operator notifies you of a delay in completing a call placed with her, she may either offer to try the call again or suggest that you place your call again at a later time. Acknowledge with "OK" and disconnect by depressing the CLEAR control button.

Whenever the operator tries the call again and is able to complete it, she will call you and report ready; for example, "RDY WITH (called place)," adding, if necessary, to the called station, "PLS ANNOUNCE (called place)."

When the called station answers, type your firm name and city, or, depress the HERE IS key, and proceed with your communication.

Preparing and Handling Tape Messages

a. Preparing a Message in Tape.

(1) If a page copy is desired, proceed as follows.

(a) On machines not equipped with slow release relay feature.

Place the KEYBOARD CONTROL KNOB in K-T (Keyboard Tape) position.

Depress the LOCAL control button.

TAPE READ switch should be in the STOP position.

Depress SEND key; then, CAR RET LINE FEED LTRS and then type the message.

As the tape is perforated, a page copy is printed.

- (b) On sets equipped with slow release relay feature. Same as in (a) preceding, except that the TAPE READ switch may be in either the START or STOP position.

This method of operation permits transmission of a message from the TAPE READER, while using the keyboard to prepare a tape. A page copy of the tape being prepared may also be obtained.

- (2) If no page copy is desired, proceed as follows.

Use T setting.

Depress LOCAL control button.

TAPE READ switch is in the STOP position.

Note: If a tape message is to be transmitted from the TAPE READER while also preparing a tape, this switch may be placed in the START position.

Depress SEND key; then, CAR RET LINE FEED LTRS. Type the message.

As the tape is perforated, it may be checked by reading the printed characters on the tape, if punch is equipped with a typing mechanism; otherwise, by reading the perforated codes.

b. Receiving an Incoming Message While Preparing a Tape.

When perforating tape, an incoming call is indicated by a bell ring. Proceed as follows:

Place KEYBOARD CONTROL KNOB in K setting, when the bell rings.

Discontinue local work and answer the call by depressing the ANSWER control button.

Type answer to the call in the regular way, unless your station is equipped for automatic answering.

Note: On sets equipped with a reperforator mechanism, precise operating procedure may vary depending on local wiring arrangements at the individual station.

c. Correcting Errors in Tape.

To correct errors in tape, it is necessary to delete not only the error, but all the characters that follow.

Tape is moved back in the punch by depressing the TAPE B SP key on the keyboard once for each character to be deleted, until the first wrong character that must be corrected is over the punch pins. The LTRS key (which punches all channels in the tape) is then depressed the same number of times that the TAPE B SP was operated, or, until there is fresh tape at the punch.

The portion of the message that has been deleted is retyped. It should be noted, however, that the characters which have been deleted are still registered on the character counter. Therefore, when the counter indicates the end of the line, as many additional characters may be typed as have been deleted.

d. Care of the Tape.

To remove tape from the perforator, operate the LTRS key until several LTRS codes appear outside the punch. Then tear the tape. If, instead of tearing the tape, it is desired to place it in the TAPE READER, however, the LTRS key is operated until there are sufficient LTRS characters to allow the tape to be placed in the reader.

Whenever considerable tape is prepared in advance of sending, it should be stored carefully; for example, wind the tape on the thumb and little finger in the form of a figure eight, and then place it in a container. This will prevent damage to the tape, thus insuring that it will feed smoothly through the tape reader when being transmitted.

e. Inserting Tape in Tape Reader.

If tape is not to be torn, perforate enough tape to reach from the punch block to the TAPE READER.

With the TAPE READ switch in the FREE position, feed the tape, surface facing upward, under the TAPE GATE. The upper surface of the tape has the hinged chads resulting from the partial perforation. The hinged side of chads go through reader first.

The tape feed holes in the tape fit on the teeth of the tape feed wheel. The code holes of the first character to be transmitted should be placed directly over the sensing pins if the reader is of the "single contact" type, or, placed one character ahead of the sensing pins in line with the locating mark, if the reader is of the "multi-contact" type. When the tape is in position, if it is to be transmitted immediately, the TAPE READ switch is moved to the START position. If, however, there is to be any interval before start of transmission, it is advisable to move the switch to the STOP position so that the tape will not accidentally be moved before transmission begins.

If tape is twisted, rumpled, or uneven, or for any reason does not lie flat, it usually can not be inserted while switch is in FREE. In such cases, it is necessary to open the TAPE GATE in order to set the tape in place. After setting the tape in place, the TAPE GATE is closed, and the switch is left in the STOP position until ready to begin transmitting.

f. Transmitting a Tape Message.

- (1) On machines not equipped with a slow release relay feature. The TAPE READER is operative when the keyboard control knob is in either the T or K-T position, although it is not normally used in the latter position.

After reaching the called station, the TAPE READ switch is moved to the START position. The tape then automatically feeds through the reader.

Tape is observed occasionally to make certain that it does not become twisted. If it does, it must be straightened; if necessary, the read switch is moved to the STOP position while the tape is straightened.

If any portion of the tape is damaged, stop the reader by operating the switch to the STOP position and then to the FREE position; move the tape over to the next good portion, and reset it. Operate the KEYBOARD CONTROL KNOB to the K (Keyboard) position, send the damaged portion of the tape message by typing on the keyboard. Then return to the T or K-T position and again start the tape reader.

At the end of a tape, the reader will automatically stop operating. As a precaution, however, it is advisable to have the TAPE READ switch in the STOP position whenever a tape is not being transmitted.

- (2) On machines equipped with a slow release relay feature. The operation is the same as in (1) preceding, except that it is permissible also to transmit tape when the knob is in the K-T position. If this is done, no page copy of the message transmitted is obtained.

HOW TO USE TWX SERVICE TO THE BEST ADVANTAGE

Handling Calls

Answer incoming calls promptly by typing your firm name, unless your station is equipped for automatic answering.

Faster service is obtained on outgoing calls by dialing direct. When assistance is required, or, when some special service is needed, such as making a call "collect," the call is placed with the TWX assistance operator.

Have all the necessary material ready before originating a call, so that you will be ready to proceed as soon as the called station is reached.

Make sure of the called TWX number before making a call.

Use the latest copy of the TWX Directory and keep up-to-date your list of frequently called numbers.

Start your message as soon as an answer is received from the called station. The following procedure is recommended.

- a. Have the message that is to be transmitted ready before placing a call. Whenever possible, avoid sending from dictation.
- b. After dialing, listen for any signals, such as the "busy" signal. On calls filed with the operator, she will report on the call.
- c. Note the called station answer to make sure it is the correct station.

- d. Immediately identify your station and proceed with the communication.

Answer incoming calls promptly by typing your firm name, unless your station is equipped for automatic answering. In the latter case, if the LOCAL control button is depressed, the automatic answer feature will be disabled until the ANSWER control button is depressed.

Typing

Accurate and speedy typing is important. Errors in typing, especially where figures are involved, may have serious consequences. Whenever an error is noted, correct it promptly; keep retyping to a minimum.

Whenever recurring trouble is encountered on a connection, such as scrambling of type, report the trouble to the operator, if you originated the call, and request a better connection.

When typing figures in a communication, verify the figures at the end of the message to insure accuracy.

Slow typing takes more time and thus increases the cost of a call. Develop speed in typing by using available spare time to practice. Depress the LOCAL control button in order to practice. When finished, depress the CLEAR control button.

In using abbreviations and codes to speed up a communication, use only those that you are sure will be understood by the other attendant.

Disconnecting

A prompt disconnect signal reduces chargeable time and frees the calling and called stations for other calls.

Disconnect by depressing the CLEAR control button.

If you wish to make successive calls, disconnect after each call and then originate the next call.

Practice or Other Local Use of the Teletypewriter

To use the teletypewriter locally or for practice purposes, depress the LOCAL control button. Ascertain that the KEYBOARD CONTROL KNOB is in the desired position.

When finished, depress the CLEAR control button.

Use of the teletypewriter in the LOCAL position does not make

the station busy to incoming calls. If an incoming call is received while in the LOCAL position, discontinue the local work; note whether the KEYBOARD CONTROL KNOB is in the desired position; depress the ANSWER control button; and type your answer to the call, unless your station is equipped for automatic answering.

TELETYPEWRITER MAINTENANCE

The Telephone Company maintains the teletypewriter and the service. Teletypewriters are inspected and serviced periodically. It is the attendant's responsibility to:

- a. Keep the teletypewriter equipped with sufficient paper and with standard teletypewriter ribbons that are in good condition.
- b. Keep an adequate supply of paper and ribbons on hand.
- c. Keep the type clean. Use a dry typewriter brush to clean the type. Do not use any cleaning solution on the TYPE BOX.
- d. Report trouble by telephone to the Telephone Company.

How to Report Trouble

If the equipment is not operating satisfactorily or if you know that repairs are needed, reach "Repair Service" (or any other location that is specified locally) by telephone. Make sure that your report includes your TWX station number.

- a. Teletypewriter Turned "On," But Machine Not Running. Make certain that the plug on the teletypewriter power cord is properly seated in the power outlet.

If the power plug is properly connected, determine whether the power supply in the building has failed by checking the lights in the room, another teletypewriter, or other electrically operated machines in the office. If there is no power, report this trouble as you would report "no lights."

If unable to clear the trouble, notify the Telephone Company.

- b. Paper Feed Troubles. If the paper feeds to one side, feeds incorrectly, tears or jams, check the following and take any corrective action required:

Has the paper been inserted in the machine correctly, according to instructions?

Is the PAPER RELEASE LEVER in the correct position—forward?

Is the machine too close to the wall so that the paper gets jammed?

Is too much paper allowed to accumulate behind the machine so that it can't feed out of the machine properly?

After opening and closing individual doors of the cabinet, has the paper been brought out through the opening so that it is feeding out at the top?

Has the paper been torn off evenly so that it is feeding out properly?

If the trouble continues after checking the above and making any necessary corrections, notify the Telephone Company.

- c. Ribbon Troubles. If ribbon is feeding properly but print is faint, a new ribbon is needed.

If the ribbon is not feeding or fails to reverse, check the following:

Be sure a standard teletypewriter ribbon has been used.

Make certain that it has been put on according to instructions. Check to see that the ribbon is not worn so badly that it has caught on some part of the teletypewriter or typing unit.

See that the ribbon spools are not damaged.

In failure to reverse, make sure that the reversing eyelet on each side is correctly located between the SPOOL and the REVERSE LEVER.

If unable to clear the trouble, notify the Telephone Company.

Use of Automatic Test Line

The automatic test line (ATL) provides a source of signals needed to test a TWX station.

Generally, a test is made only as directed by the Telephone Company. The following steps are involved in testing the station:

- a. Before testing with the ATL, the machine is tested in the LOCAL mode.
- b. To test with the ATL, proceed as follows:
 1. Depress the ORIGINATE control button and listen for dial tone.
 2. Dial the locally specified test line number. Listen for ringing signal.
 3. After about 1 second, ringing stops and a steady tone is heard. A second later, this tone stops and the teletypewriter is turned on automatically.

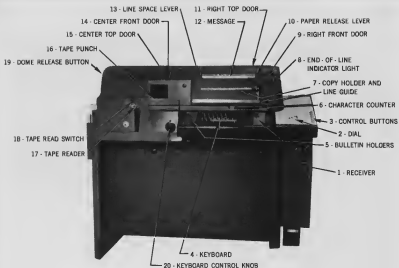
Note: If the ATL is in use, intermittent "letters" characters will be returned to the TWX to indicate proper connection has been made. The waiting period should be only a few seconds.

4. The ATL sends the following copy to the station:
THE QUICK BROWN FOX JUMPED OVER A LAZY
DOG'S BACK 1234567890 *** SENDING. (The "****"
will be a three-letter combination used to identify the
particular ATL being used.)
Two lines of this copy are sent marked, "UNDIS"; two lines
marked, "DIS 28"; two lines marked, "DIS PAD." This
is followed by: "GA RY (bell)."
5. Immediately after receiving "GA RY (bell)," the station
attendant sends approximately a half line of RY's, or any
other signal or group of characters.
6. The ATL then sends either TRANS OK, or, OUT LIM,
followed by "FLIP (2 bells)."
7. Immediately after receiving, "FLIP (2 bells)," depress the
CLEAR control button and then, before the CLEAR lamp
goes out, immediately depress the ANSWER button and
hold it depressed until the ANSWER lamp lights. This
changes the station from the originating to the answer mode.
8. The ATL again sends the same copy as in "4" above, fol-
lowed by: "GA RY (bell)."
9. Immediately after receiving "GA RY (bell)," again send
approximately a half line of RY's, or any other signal or
group of characters.

10. The ATL then sends either TRANS OK, or, OUT LIM, followed by TNX END. The station will run open for about one second, CLEAR lamp lights, ANSWER lamp goes out, and the teletypewriter is turned off automatically. The CLEAR lamp goes out after about one second.
- c. The telephone testman or repairman will then generally question the attendant on the copy received, particularly as to whether it was TRANS OK or OUT LIM as specified in "6" and "10" preceding.

Notes

Figures 1 through 6



NO. 28 AUTOMATIC SEND-RECEIVE TELETYPewriter

Figure 1

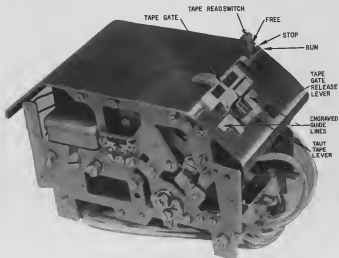


Figure 2

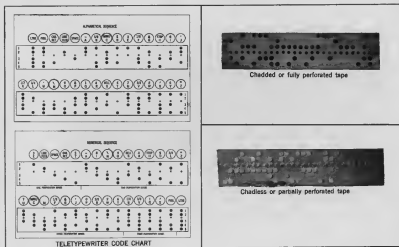


Figure 3

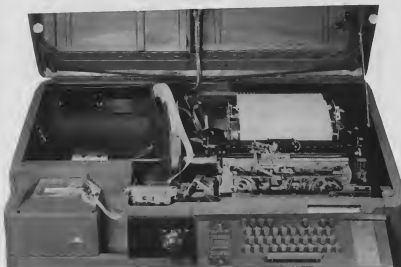


Figure 4



Note: Only stations with automatic answers have a HERE IS key.

Figure 5

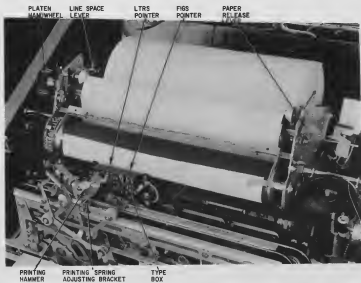


Figure 6

Figures 7 through 14



Figure 7

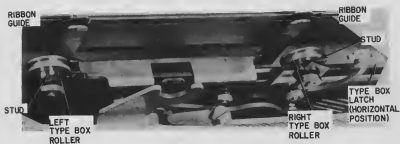


Figure 8

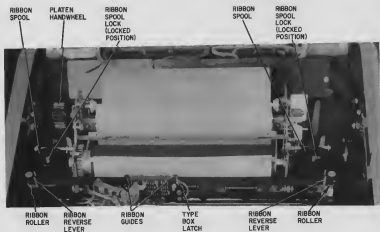


Figure 9

Figure 10

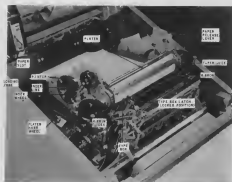
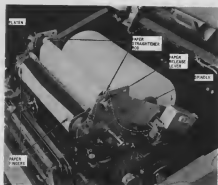
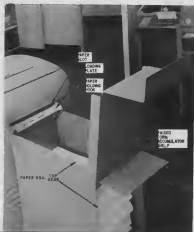


Figure 11

Figure 12



ITEM	GRADE A	GRADE B	GRADE C
4295	\$3.05	\$2.75	\$2.50
716	.95	.85	.75
92851	5.35	5.00	4.65
3820	9.50	7.00	5.75
98926	10.25	9.80	8.60
527	.95	.80	.70

Tabulation (Without TABULATOR Device)

Figure 13

SHOP ESTIMATES INDICATE WE CAN PRODUCE
ENTIRE OUTPUT OF NO. 17H3 CHROME PLATED
CLAMPS AT OUR PHILA FACTORY, OUTPUT
ABOUT 12,000 PER DAY AT \$62.50 PER THOU-
SAND, DIVIDED \$42.50 FOR MATERIAL, \$16 FOR
LABOR AND \$4 SUPERINTENDENCE AND HOUSE
SERVICE. CAN REACH FULL PRODUCTION 15
DAYS AFTER AUTHORITY RECEIVED

T KIRWIN

17H3-12,000-62.50-42.50-16-4-15

HAVE YOU RECEIVED AUTHORITY TO PRO-
CEED WITH BETA CO ORDER

GA PLS

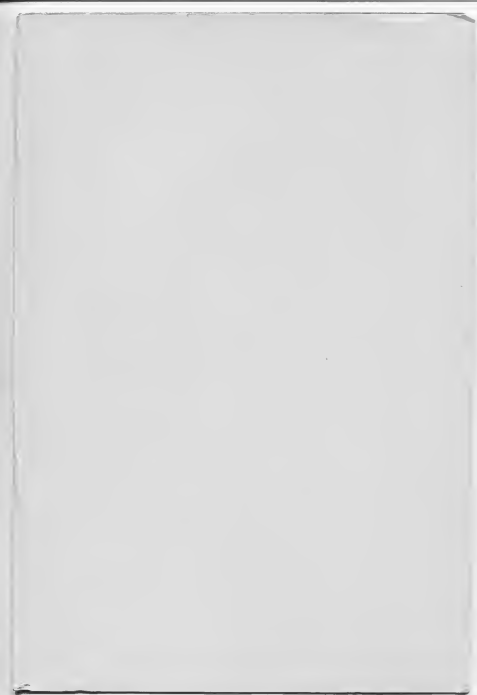
NO EXPECT WORK TOMORROW

END

END.

Message

Figure 14





TTY 1